



# PUBLIC NOTICE

US Army Corps  
of Engineers  
New York District  
Jacob K. Javits Federal Building  
New York, N.Y. 10278-0090  
ATTN: Regulatory Branch

**In replying refer to:**

Public Notice Number: NAN-2009-00224

Issue Date: **May 7, 2009**

Expiration Date: **June 5, 2009**

**To Whom It May Concern:**

The New York District, Corps of Engineers has received a mitigation bank prospectus to establish the Richard P. Kane Wetland Mitigation Bank. This notice is to inform interested parties of the proposed activities and solicit comments.

**AUTHORITY:** Issuance of a public notice regarding proposed mitigation banks is required pursuant to the "Compensatory Mitigation for Losses of Aquatic Resources; Final Rule," (Rule) as published in the April 10, 2008, Federal Register, Vol. 73, No. 70, Pages 19594-19705 (33 Code of Federal Regulations, Parts 325-332). The proposed wetland mitigation bank will be reviewed under a separate future permit action pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344).

**APPLICANT:** EarthMark NJ Kane Mitigation, LLC  
1960 Derita Road  
Concord, North Carolina, 28027

**ACTIVITY:** The mitigation bank sponsor, EarthMark NJ Kane Mitigation, LLC, proposes to establish, enhance, preserve, and maintain approximately 254 acres of tidal emergent wetlands, scrub shrub wetlands, freshwater forested wetlands, open water channels/pools, mudflat habitat, and uplands in accordance with the provisions of a Mitigation Banking Instrument (to be developed). If authorized, the wetland mitigation bank credits would be sold to New Jersey transportation agencies including the New Jersey Transit, the Port Authority of New York and New Jersey, the New Jersey Department of Transportation, and New Jersey Turnpike Authority. The bank sponsor proposes to enhance wetland functions, and services (water quality, flood storage, and wildlife habitat), including re-establishing and improving hydrologic flow to the marsh plain, creating a meandering channel/emergent marsh complex, and replacing monotypic stands of common reed (*Phragmites australis*) with a diversity of native wetland plants with enhanced wildlife value. The primary wetland system within Parcels 1 and 2 would be a tidal emergent marsh, mudflat, and an open water ecosystem comprised of *Spartina* spp. dominated plant communities. The primary wetland system within Parcel 3 would be a freshwater forested wetland system with some open water habitat. The proposed wetland areas would provide habitat for a wide variety of wetland-dependent and terrestrial wildlife species. Existing upland berms would be enhanced or constructed to prevent hydrologic trespass to adjacent properties as well as promote plant and wildlife species diversity. Uplands situated within the proposed mitigation bank site would be vegetated with native plant species. All aspects associated with the establishment, operation, maintenance, and monitoring of the proposed bank is discussed in the attached "Richard P. Kane Wetland Mitigation Bank, Final Prospectus", dated March 2009.

The proposed mitigation bank may be one of a number of practicable options available to New Jersey Transportation Agencies to compensate for unavoidable wetland impacts associated with Department of the Army permits issued under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344).

CENAN-OP-RW  
PUBLIC NOTICE NO. NAN-2009 - 00224

The attached mitigation bank prospectus will be reviewed by the New York District of the U.S. Army Corps of Engineers in consultation with a group of federal and state agency representatives known as the Interagency Review Team (IRT). The New York District of the U.S. Army Corps of Engineers is the chair the IRT.

The proposed mitigation bank sponsor is in the process of preparing mitigation bank design plans for the site which will be submitted to the U.S. Army Corps of Engineers for consideration as part of a Department of the Army permit application pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344).

**WATERWAY:** Mudabock Creek (Hackensack River Watershed)

**LOCATION:** Boroughs of Carlstadt, Moonachie, and South Hackensack, Bergen County, New Jersey.

**FEDERAL EVALUATION OF THE PROPOSAL:** The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate this proposed mitigation bank. The New York District Corps of Engineers in evaluating this proposal will consider any comments received. Comments will be used to assess the potential for the proposed mitigation bank to provide appropriate compensatory mitigation for activities authorized by Department of the Army permits.

ALL COMMENTS REGARDING THE PERMIT APPLICATION MUST BE PREPARED IN WRITING AND MAILED TO REACH THIS OFFICE BEFORE THE EXPIRATION DATE OF THIS NOTICE, otherwise, it will be presumed that there are no objections to the activity.

It is requested that you communicate the foregoing information concerning the activity to any persons known by you to be interested and who did not receive a copy of this notice. If you have any questions concerning this mitigation bank prospectus, you may contact this office at (917) 790-8412 and ask for James Cannon.

For more information on New York District Corps of Engineers programs, visit our website at <http://www.nan.usace.army.mil>



Richard L. Tomer  
Chief, Regulatory Branch

Attachment: Richard P. Kane Wetland Mitigation Bank, Final Prospectus, dated March 2009

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# **RICHARD P. KANE WETLAND MITIGATION BANK**

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## **FINAL PROSPECTUS**

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*Submitted to:*

**The Meadowlands Interagency Mitigation Advisory Committee  
U.S. Army Corps of Engineers  
New York City, New York**



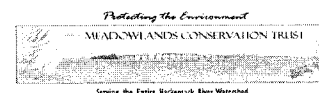
*Submitted by:*

**EarthMark NJ Kane Mitigation, LLC.  
Concord, North Carolina**



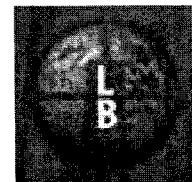
*In coordination with:*

**The Meadowlands Conservation Trust  
Lyndhurst, New Jersey**



*Prepared by:*

**The Louis Berger Group, Inc.  
Morristown, New Jersey**



**March 2009**

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# EARTHMARK NJ KANE MITIGATION, LLC. KANE WETLAND MITIGATION BANK PROSPECTUS

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## I. INTRODUCTION

The Louis Berger Group, Inc. (Berger), on behalf of EarthMark NJ Kane Mitigation, LLC (Bank Sponsor), is pleased to present this Prospectus for the Richard P. Kane Wetland Mitigation Bank (Bank). This Prospectus was prepared in accordance with the *Final Rule for Compensatory Mitigation for Losses of Aquatic Resources*; (Federal Register, Vol. 73, No. 70, April 10, 2008) and the Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A-15). The Prospectus is submitted to the U.S. Army Corps of Engineers – New York District (Corps), Chair of the Interagency Review Team (IRT), also referred to as the Meadowlands Interagency Mitigation Advisory Committee (MIMAC), to formally initiate the planning and agency review process. For the purposes of this Bank, the MIMAC and IRT are the same.

- A. **Purpose, Objective and Need.** The **purpose of the Bank** is to provide compensatory mitigation for unavoidable impacts to waters of the US, including wetlands, which result from transportation-related activities authorized under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, the New Jersey Freshwater Wetlands Protection Act of 1987, New Jersey Waterfront Development Law, and the Flood Hazard Area Control Act provided such use has met all applicable requirements. The Bank's **objective** is to provide economically efficient and flexible off-site compensatory mitigation opportunities for NJ transportation agencies seeking to develop in accordance with all relevant Federal, State and local regulations. The Bank would be established to compensate for wetland and other aquatic resource losses anticipated by such authorized development within the Bank Service Area in a manner that contributes to the long term ecological functioning of the Hackensack River Drainage Basin, with an immediate goal of no-net-loss and a long-term goal of a net gain of wetlands functions and services. The goals of the Bank are the establishment of wetlands, streams and forest on this site to provide a positive contribution to water quality, plant and animal habitat and erosion control. The Bank will establish approximately 225 acres of tidal emergent marsh, streams and mudflat, approximately 15 acres of freshwater forested wetland habitat, and approximately 14 acres of upland habitat.

The **purpose of this Prospectus** is to initiate formal agency involvement and review of the Bank. Prior to submittal of this Prospectus, Berger and the Bank Sponsor presented conceptual plans for the Bank to the IRT on October 22, 2008 and January 21 and February 18, 2009. In addition, the IRT conducted a site visit to the Bank on March 18, 2009. A draft Prospectus was submitted to the IRT on February 9 and a revised version was submitted March 2. IRT comments, received on March 13, were incorporated into this Final Prospectus. Information provided in this Prospectus will serve as the basis for establishing a Mitigation Banking Instrument (MBI). The MBI will be developed by the Sponsor to establish the Bank. The MBI will contain the Site Development Plan and will include location maps, summary of existing conditions and reference sites, hydrologic analysis, design criteria, success criteria, long term real estate instrument, and plans and specifications for construction, operation, monitoring and maintenance of the Bank.

**Need.** The Hackensack Meadowlands District is bordered and crossed by several major transportation routes including the New Jersey Turnpike and New Jersey Highways (Routes) 3, 17, 46, and 120. In addition, railroad facilities bordering or crossing the Meadowlands are used by Amtrak, NJ Transit and the Port Authority Trans-Hudson Line (PATH). The Bank may be utilized by the following NJ transportation agencies: New Jersey Transit (NJ Transit), New Jersey Department of Transportation (NJ DOT), Port Authority of New York and New Jersey (Port Authority), and the New Jersey Turnpike Authority (NJTA). These agencies have an acute need for mitigation of anticipated impacts to wetlands in the Meadowlands from critical transportation projects. At the current time, there are no wetland mitigation bank credits available within the Hackensack Meadowlands District, or within the USGS Hydrologic Unit Codes (HUCs) that could potentially be serviced by a wetland mitigation bank within the Hackensack Meadowlands District. Yet, there is a large need for wetland mitigation credits by transportation projects that may be held up due to a lack of available mitigation.

- B. Location and Ownership of the Mitigation Bank.** The Meadowlands Conservation Trust (MCT), the current property owner, has by virtue of a Lease Agreement conveyed the right to develop a wetland mitigation bank on the subject property (see Exhibit A, Bank Location Map) to the Sponsor. The Sponsor has developed a conceptual plan that will result in approximately 240 acres of wetland habitat and approximately 14 acres of upland habitat on this property. The Sponsor is a subsidiary of EarthMark Mitigation Services, LLC. Title to the property is held by MCT and will remain in MCT's name after the Bank is established. The Sponsor's qualifications to successfully complete the Bank are provided in Section V of this Prospectus.

The MCT property is approximately 587 acres in total, but the proposed Kane Mitigation Bank encompasses only approximately 254 acres of this property. The Kane Bank is located adjacent to the Hackensack River in the Boroughs of Carlstadt, Moonachie, and South Hackensack, Bergen County, New Jersey. The property is located on three distinct parcels totaling approximately 254 acres:

- Parcel 1 (approximately 192 acres) is located on Block 131 Lot 8 (with the majority of land being west of the Williams/Transco pipeline road) in Carlstadt;
- Parcel 2 (approximately 45 acres) is located on Block 131 Lot 8 (portion of land on the east side of Williams/Transco pipeline road) in Carlstadt and Lot 10 (straddling both Carlstadt & South Hackensack) and Lot 11 in Carlstadt; and
- Parcel 3 (approximately 17 acres) is located on Block 106 Lots 3.01 & 3.02 in South Hackensack, Block 23 Lot 3 in Moonachie, and Block 131 Lot 8 in Carlstadt.

The exact acreage of these parcels, as well as the location of any existing easements, is currently being surveyed by a licensed NJ surveyor. Areas within the existing Williams/Transco pipeline easement and NJ Turnpike right-of-way will be excluded from the Bank. The project site is bordered on the south by the NJ Turnpike Western Alignment, on the north by industrial developments in Carlstadt, South Hackensack and Little Ferry, on the west by Moonachie Creek, and on the east by Losen Slote and the Hackensack River.

- C. Project Description.** The Sponsor will establish, enhance, preserve, and maintain approximately 254 acres of emergent wetlands, scrub shrub wetlands, freshwater forested wetlands, open water channels/pools, mudflat habitat, and uplands in accordance with the provisions of a MBI (to be developed) and regulatory permits (to be reviewed and subsequently approved) by the Corps and NJDEP. The Ecological Suitability and Baseline Conditions Report, presented in Exhibit B, describes the existing conditions of the degraded site and the Conceptual Design Report, presented as Exhibit C, describes and depicts the plan to improve the ecological functions and services of the site. The Sponsor shall maintain the Bank in accordance with the Maintenance and Monitoring and Bank Closure provisions of a MBI and regulatory permits to be approved by the Corps and NJDEP in consultation with the IRT. The Bank will be closed at the end of its operational life, which is 10 years from the date of the completion of the grading and planting tasks, successful completion of all performance standards as documented by approved monitoring reports, or until the sale of all credits, whichever comes last. After that, the Bank will be maintained by MCT (the property owner) in accordance with the Long-Term Management provisions of the MBI. The Bank will be protected in perpetuity by a recorded Conservation Restriction on the property.

The Conceptual Design for the Bank is presented as Exhibit C. The Sponsor shall improve wetland functions and services (water quality, flood storage, and wildlife habitat), including re-establishing and improving hydrologic flow to the marsh plain, creating a meandering channel/emergent marsh complex, and replacing monotypic stands of *Phragmites australis* with a diversity of native wetland plants with improved wildlife value. The primary wetland system within Parcels 1 and 2 will be a tidal emergent marsh, mudflat, open water ecosystem comprised of *Spartina* spp. dominated plant communities. The primary wetland system within Parcel 3 will be a freshwater forested wetland system with some open water habitat. These wetlands will provide habitat for a wide variety of wetland-dependent and terrestrial wildlife species. Upland berms will be enhanced/constructed to prevent hydrologic trespass to adjacent properties as well as promote plant and wildlife species diversity. These uplands will be vegetated with native plant species.

- D. Water Rights.** Sufficient water rights exist to support the long-term sustainability of the Bank. The freshwater forested wetlands will be primarily supported by groundwater, which is abundant. The tidal wetlands will be supported by tidal waters primarily from the Hackensack River. Details on the proposed hydrology of the Bank are provided in Exhibit C.
- E. Ecological Suitability and Baseline Conditions.** Information collected thus far documenting the baseline conditions for the Bank site, including existing topography, hydrology, soil, vegetation, wetlands, and wildlife conditions, are presented in the Ecological Suitability and Baseline Conditions Report, Exhibit B.
- F. Establishment and Use of Credits.** The exact number of credits will be determined once the site survey, design, and functional assessments are completed by the Sponsor and approved by the IRT. The credits will be sold to NJ transportation agencies (NJ Transit, Port Authority, NJ DOT and NJTA) provided such agencies have met all applicable regulatory requirements, including avoidance and minimization, and sale has been authorized by the appropriate agencies. Bank credits will not be released for debiting until specific milestones associated with the Bank's protection and development are achieved. Used of credits will be established by the Corps and NJDEP in consultation with the IRT.
- G. Review Team.** The Interagency Review Team (IRT) consists of the members of the MIMAC, specifically:
1. U.S. Army Corps of Engineers, New York District, (Corps), Chair,
  2. U.S. Environmental Protection Agency, Region II (EPA)
  3. U.S. Fish and Wildlife Service (FWS), Pleasantville, NJ, field office
  4. National Marine Fisheries Service (NMFS), Sandy Hook, NJ, field office
  5. New Jersey Department of Environmental Protection (NJDEP)
  6. New Jersey Meadowlands Commission (NJMC).
- H. Exhibits.** The following Exhibits are incorporated as appendices to this Prospectus:
- Exhibit A Bank Location Map
  - Exhibit B Ecological Suitability and Baseline Conditions Report
  - Exhibit C Conceptual Design Plan
  - Exhibit D Service Area Map

## II. ESTABLISHMENT OF THE BANK

- A. Implementation.** The Sponsor agrees to perform all necessary work, in accordance with the provisions of the MBI and federal and state permits, to establish, enhance, preserve, and maintain approximately 225 acres of emergent marsh and other aquatic habitat, approximately 15 acres of freshwater forested wetland habitat, and approximately 14 acres of upland habitat until it is demonstrated to the satisfaction of the Corps and NJDEP, in consultation with the IRT, that the project complies with all requirements, or until all credits are sold, whichever is later. The exact acreages of these habitat types will be determined once the site survey and design are completed by the Sponsor and approved by the IRT.
- B. Environmental Documentation.** The Sponsor will obtain all appropriate environmental documentation, permits or other authorizations needed to establish and maintain the Bank. This Prospectus does not fulfill or substitute for such authorization.
- C. Establishment of the Bank.** The Bank will be established as described in this Prospectus and the credits will become available in accordance with the credit generation schedule specified in the MBI. If the Sponsor determines that modifications must be made in the design plans to ensure successful establishment or enhancement of habitat, the Sponsor shall submit a written request for such modification to the Corps for distribution to the IRT. Due to the current high demand for freshwater credits, Parcel 3 (the freshwater portion) potentially may be removed from the Bank and completed as a separate off-site mitigation site to be approved by the Corps and NJDEP, in consultation with the IRT and in accordance with the MCT deed.

- D. Financial Assurance Requirements.** The Sponsor shall provide financial assurances, as established by the Corps and NJDEP in consultation with the IRT, to ensure a high level of confidence that the Bank will be successfully completed and maintained in perpetuity. The details of these financial assurances will be provided in the MBI.

### III. OPERATION OF THE BANK

- A. Service Area.** The purpose of the Kane Bank is to provide effective off-site compensatory mitigation for unavoidable impacts to wetland resources associated with regulated activities occurring within the Hackensack Meadowlands District (District) or with a component in the District by NJ transportation agencies (NJ Transit, Port Authority, NJ DOT and NJTA). The proposed service area is comprised of the two watersheds that surround and encompass the District so that projects with a component in the District are included in the Service Area (see Exhibit D, Service Area Map). Decisions authorizing use of credits from the Bank will be made by the Corps and NJDEP, in consultation with the IRT, on a case-by-case basis in accordance with applicable permit requirements.

- B. Assessment Methodology.** The credits and debits for NJ transportation agencies utilizing the Bank shall be determined by the Corps and NJDEP, in consultation with the IRT, on a project-by-project basis using the methodology that the Corps and NJDEP, in consultation with the IRT, determine to be appropriate. Methodologies include the *Regional Guidebook for Hydrogeomorphic Assessment of Tidal Fringe Wetlands in the Hackensack Meadowlands* (HGM) (NJMC, 2004) and the Indicator Value Assessment (IVA) method presented in the Hackensack Meadowlands District Special Area Management Plan Draft Environmental Impact Statement. The exact number of credits to be provided by the Bank will be determined once the site survey, design, and functional assessments are completed by the Sponsor. The available credits will reflect the difference between before and after Bank establishment site conditions as determined by the approved functional assessment and approved by the Corps and NJDEP in consultation with the IRT.

Compensatory mitigation shall be available to NJ transportation agencies at a ratio generally expected to average 1 credit debited per 1 acre of permitted wetland impact. Projects proposed for utilization of credits will be submitted to the Corps and NJDEP for consideration, in consultation with the IRT, where appropriate, in conjunction with the permitting for such projects. The utilization of mitigation credits from the Bank to compensate for project impacts will be determined on a site and project specific basis by the Corps and NJDEP in consultation with the IRT where appropriate. The Corps and NJDEP reserve the right to require a higher compensation ratio depending on the project.

- C. Success Criteria.** The Sponsor shall be responsible for assuring the success of the Bank establishment activities and goals described in Exhibit C. The success of the Bank will be measured by performance standards approved by the Corps and NJDEP in consultation with the IRT, as set forth in the Corps and NJDEP permits and the MBI. The standards define the conditions under which the Bank would be judged successful and provide monitoring and maintenance requirements to uncover and correct deficiencies. The Bank will be considered successful if the Sponsor demonstrates to the Corps and NJDEP that the appropriate areas have been established, enhanced, or preserved and the goals of the Bank have been met. After successful completion of each planning, construction and monitoring task, the Sponsor shall notify the Corps and NJDEP in writing. In addition to the written notice, the Sponsor will submit photographs of the completed project task along with a photo location map. The Corps and NJDEP, in consultation with the IRT, will confirm whether or not the tasks are successfully completed for purposes of releasing credits.
- D. Conditions on Debiting.** Prior to the sale of any credits, the following requirements will be met: (1) the MBI and mitigation plans will be approved by the Corps and NJDEP, in consultation with the IRT; (2) financial assurances satisfactory to the Corps and NJDEP shall be posted; (3) all applicable regulatory permits and approvals will be secured; and, (4) the MBI will be signed by the Corps and NJDEP and any members of the IRT who choose to sign the instrument.

#### IV. MAINTENANCE AND MONITORING OF THE BANK

- A. Maintenance Provisions.** The Bank will be designed to be self-sustaining over time. However, some active management and maintenance is anticipated to ensure the long-term viability and sustainability of the Bank. The Sponsor agrees to perform all necessary work to maintain the Bank consistent with the maintenance criteria established in the MBI. The Sponsor shall continue with such maintenance activities until closure of the Bank. Upon closure of the Bank, the landowner (MCT) shall implement the management requirements established in the Closure Plan and Long-Term Management Plan. Deviation from the approved maintenance plan is subject to review and written approval by the Corps and NJDEP following consultation with the IRT.
- B. Monitoring Provisions.** The Sponsor agrees to perform all necessary work to monitor the Bank to demonstrate compliance with the success criteria established in the MBI, and any regulatory permits, for a period of 5 years within the tidal emergent wetland and 10 years within the freshwater forested wetland or until success criteria are met, whichever is later. The monitoring will begin at the end of the first full growing season following completion of grading and planting (i.e., if the planting is completed in spring 2010, the first monitoring event would occur in fall 2010). After the initial 5 year monitoring period of the tidal wetland, the Sponsor, in consultation with the Corps and NJDEP, shall continue to identify any problems requiring corrective action for an additional 5 years. The Sponsor shall provide annual monitoring reports to the Corps and NJDEP on the long term success of the Bank and to identify any problems requiring corrective action. Any such corrective action shall be taken in accordance with Section E.
- C. Reports.** The Sponsor shall submit to the Corps and NJDEP, for distribution to the IRT, as-built grading and planting drawings of the Bank establishment activities and a post-construction report within 60 days after the date of completion of grading and planting activities. The as-built drawings and report shall include all aspects of the final grading elevations and planting arrangements of the Bank. In addition, the Sponsor shall submit to the Corps and NJDEP, for distribution to the IRT, eight copies of each annual report on the status of the Bank establishment activities, prepared during the growing season, no later than December 31 of each of the five years following initiation of the tidal wetland planting activities and each of the ten years following initiation of the freshwater wetland planting activities, in accordance with the permits. Two copies of each report shall be provided directly to NJDEP.
- D. Accounting Procedure.** The Sponsor shall submit a Ledger statement to the Corps and NJDEP each time credits are debited or additional credits are approved for release. If requested, the Corps may distribute the statement to other members of the IRT or the public. At a minimum, the Sponsor shall submit an annual ledger to the Corps and NJDEP for distribution to all members of the IRT, showing all transactions at the Bank for the previous year.
- E. Contingency Plans/Corrective Actions.** Should any report submitted by the Sponsor to the Corps and NJDEP note conditions requiring corrective action, the Sponsor shall determine the cause of the condition, in consultation with the Corps and NJDEP. This includes, but is not limited to, the failure of berms constructed to prohibit the tide from entering non-tidal portions of Moonachie Creek, Losen Slote Creek, and immediately adjacent freshwater wetlands. If the Sponsor, Corps or NJDEP determines the problem is due to design, construction or maintenance deficiencies, then the Sponsor shall be responsible for corrective action. Prior to commencing corrective actions, the Sponsor shall submit a detailed proposal for such a corrective action to the Corps and NJDEP for review and approval within 60 days of a determination by the Corps and NJDEP, in consultation with the IRT, that corrective measures are warranted. Once approved by the Corps and NJDEP, in consultation with the IRT, the Sponsor shall undertake such corrective action and shall, upon completion, submit to the Corps and NJDEP a summary of the work performed.
- F. Long-Term Management.** As described in Items IV.A and B of this Prospectus, the Sponsor shall conduct maintenance and monitoring of the Bank for its operational life. The Bank will be closed at the end of its



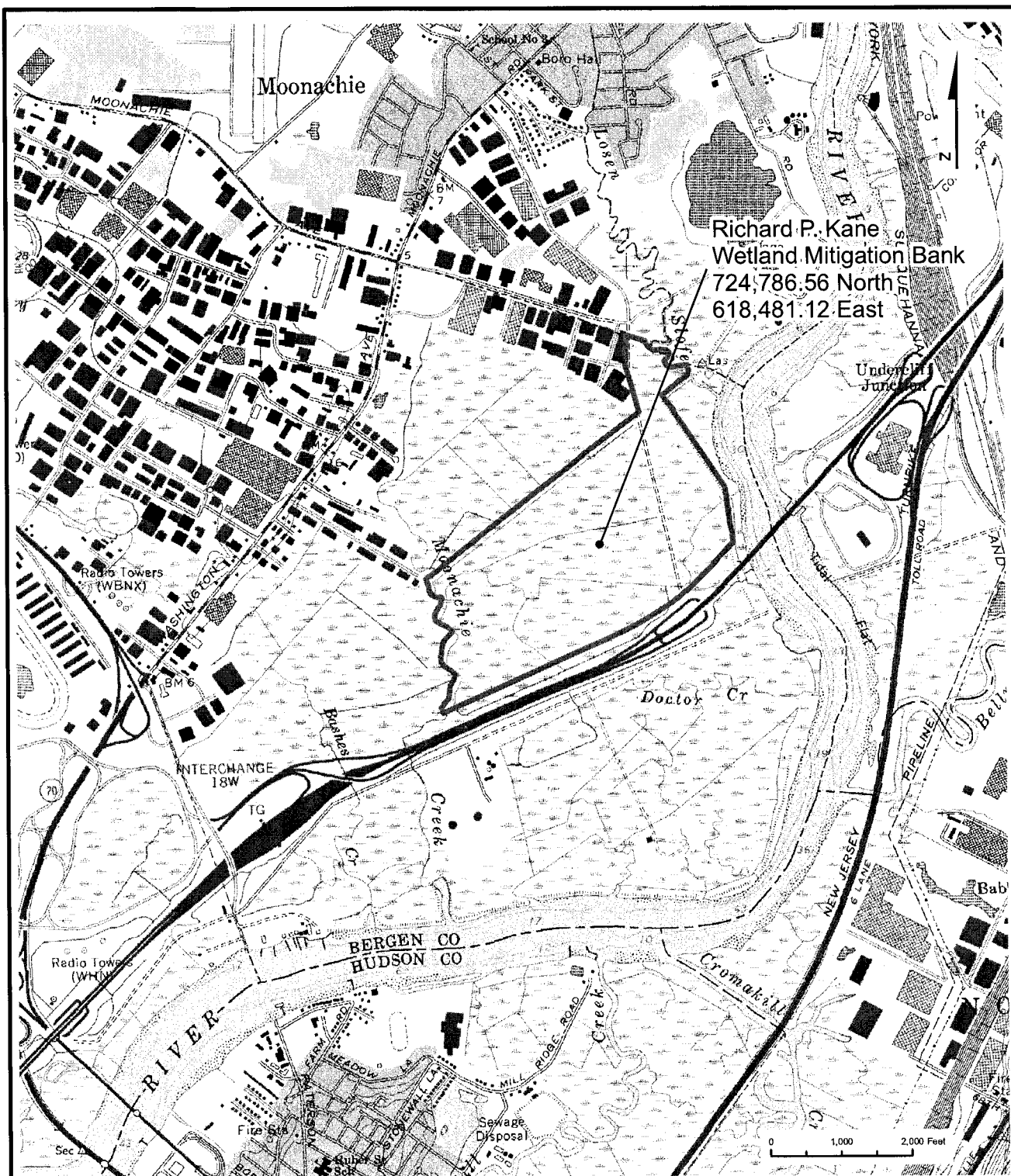
operational life, which is 10 years from the date of the completion of the grading and planting tasks, successful completion of all performance standards, or until the sale of all credits, whichever comes last. After that, land stewardship and management will be the landowner's (MCT's) responsibility. The MBI will include a Long-Term Management Plan that describes the long term management activities to be conducted by the landowner and the maintenance surety for the management activities. The Bank will be protected in perpetuity by the recorded Conservation Restriction.

## V. SPONSOR QUALIFICATIONS

The Bank Sponsor, EarthMark NJ Kane Mitigation, LLC (EarthMark), is a wetland and stream mitigation provider that delivers quality turnkey mitigation and mitigation banks for various clients within both the public and private sector. The company is a consolidation of third and fourth generation professionals with more than 200 years of combined successes. EarthMark staff have established an unparalleled track record for successfully permitting mitigation banks and efficiently transferring credits to satisfy permit-related mitigation requirements. EarthMark is located in Concord, North Carolina and is a subsidiary of EarthMark Mitigation Services, LLC based in Fort Myers, Florida. The North Carolina office provides expert "full delivery" wetland and stream restoration and enhancement. The EarthMark family of companies has over twenty years of combined wetland consulting experience.


The EarthMark Team is led by Richard Mogensen of EarthMark (Point of Contact) and includes Meadowlands-experienced staff from The Louis Berger Group, Inc. (Berger), Geo-Con, Inc. (Geo-Con) and The Dawson Corporation (Dawson). Mr. Mogensen, while working for Marsh Resources, Inc., managed this exact team of wetland designers, construction contractors and landscape contractors (Berger, GeoCon and Dawson) to develop **Phases 1 and 2 of the Marsh Resources, Inc. (MRI) Meadowlands Mitigation Bank**. Like the Kane Bank, the MRI Bank was located in an area of challenging environmental conditions. This Team developed and implemented an innovative design/build program for the first Bank in the Hackensack Meadowlands District. The MRI Bank is a 206-acre restored salt marsh that provided a wetland mitigation alternative for approved development projects permitted in the Hackensack Meadowlands District and the surrounding watershed. Prior to MRI Bank construction, the site was a degraded, *Phragmites australis* monoculture underlain with dredge spoils and peat, and was isolated from tidal inundation due to topographic elevation and a lack of tidal creeks. Mitigation credit was generated by lowering site elevations to restore tidal flow, enhancing and creating a meandering tidal channel network and island habitat complex, and reestablishing desired native plant species within a variety of natural habitats. (Jim Cannon, Corps, 917-790-8412 can verify project success). The Bank Sponsor has also successfully completed the following banks.

**The Bog Brook Enhancement Bank** was built to offset wetland impacts associated with Transcontinental Gas Pipe Line Corporation's pipeline installation and repair. The bank consists of a 1.3 acre portion of a 6.81 acre parcel located in East Brunswick, New Jersey. Forested wetland restoration and enhancement activities were initiated in fall 1992. The bank was determined to meet all success criteria and was closed after all credits were used in December 2002. Mr. Mogensen, now with EarthMark, was responsible for developing this project (Virginia Kop'Kash, NJDEP, 609-777-0454 can verify project success). **The Pott Creek Mitigation Bank** is a 75-acre bottomland hardwood and stream restoration site built exclusively for the NCDOT by principals now with EarthMark. Construction was completed in the spring of 2002. This project included the restoration of floodplain wetlands previously ditched and drained for pastureland associated with a cattle operation. Project specifics included acquiring the property, removing the cattle, developing the conceptual and final designs, and overseeing site construction. Tens of thousands of native hardwood species were replanted. In addition, a natural stream channel was also re-established through the previously ditched area. **The White Oak Creek Mitigation Site, Johnston County, NC**, is a 50-acre forested wetland restoration project in the Neuse River Watershed. It was built as a specific mitigation project for the NCDOT in Johnston County, NC. Construction and planting were completed in March of 2002. The mitigation strategy included demolition of existing structures, restoration of stock ponds to forested wetlands and wetland creation areas. (Bruce Ellis, NCDOT, 919-715-1418 can verify the success of the Pott Creek and White Oak Creek projects.)



Richard P. Kane  
Wetland Mitigation Bank  
724,786.56 North  
618,481.12 East

## Legend

 Mitigation Bank Boundary

**RICHARD P. KANE  
NATURAL AREA  
WETLAND MITIGATION BANK**

**BANK LOCATION MAP**

Source: USGS Topographic Quadrangle, Weehawken NJ.



Exhibit  
A

DATE:  
March 2009

## EXHIBIT B: ECOLOGICAL SUITABILITY AND BASELINE CONDITIONS REPORT

The purpose of the Richard P. Kane Wetlands Mitigation Bank (Bank) is to enhance a large, degraded wetland to provide effective off-site compensatory wetland mitigation for New Jersey transportation projects within the Meadowlands. The Bank is located in Carlstadt, Moonachie, and South Hackensack, within the New Jersey Meadowlands District. Exhibit A is an annotated USGS 7.5-minute quadrangle showing the site location, local topography, surface water and cultural features.

In terms of ecological suitability, most of the site is currently dominated by the invasive *Phragmites australis* (common reed) that has outcompeted native plant species. The site was historically cut off from the tidal influence of the Hackensack River by the creation of multiple berms adjacent to the river, the installation of multiple tide gates, including on Moonachie and Mudabock (also known as Muddabach) Creeks, and the construction of a human-made mosquito ditch network throughout the site. The Kane Tract was hydrologically cut off from the tidal influence of the Hackensack River on the south side of the NJ Turnpike Western Spur by the construction of a berm paralleling the river and a tide gate on Moonachie Creek. The berm was originally constructed in the early 1900s by the Bergen County Mosquito Extermination Commission, as was the tide gate. All of these situations and occurrences have severely altered the functions and services provided by the wetlands and waterways of the site.

EarthMark proposes to restore tidal hydrology to Parcels 1 and 2 to support a thriving tidal marsh habitat and to restore freshwater forested wetland habitat and hydrology to Parcel 3. The parcels to the west of Moonachie Creek must remain as freshwater systems that receive stormwater runoff from the surrounding developed areas and the design must ensure that upstream areas will not be flooded. Existing information has been carefully reviewed and utilized as much as possible to assess the ecological suitability of the site and to develop the conceptual design for the Bank. Numerous articles and reports, such as the 2002 Final Environmental Impact Statement on the Meadowlands Mills Project, detailing biodiversity, topography, hydrology, soil texture, wetland description, vegetation cover, and mitigation activities were reviewed. Site visits to the Kane Tract were conducted to verify some of the vegetation, topography, soil texture and hydrology data ascertained through the document review. This review indicates that the site is ecologically suited to be established as a Bank.

The EarthMark Team will conduct additional field and design studies to build upon the existing data on the baseline conditions at the site. A preliminary review of some of the existing site data, as well as a description of ongoing data collection efforts, is provided below. A more detailed description of existing conditions and ecological suitability will be provided in the Mitigation Banking Instrument.

### 1.0 PHYSICAL CHARACTERISTICS

#### 1.1 Topography

Topographic elevations at the Bank Site are generally less than 5 feet above mean sea level. Mudabock Creek (with several small tributaries feeding it) dissects the Site and discharges into the Hackensack River via a tidegate. Moonachie Creek flows along the western boundary of the Site, and Losen Slote Creek flows along the northeastern boundary, both of these creeks also eventually discharge into the Hackensack River via a tidegate. The EarthMark Team has subcontracted with a NJ licensed land surveyor, to conduct on-site ground survey, obtain the correct survey plat and modify the existing topographic survey accordingly. Topographic mapping for the site and surrounding area shall be completed to accurately map areas obscured by *Phragmites australis*. All planimetric features including, but not limited to, roads, berms, swales, structures and utilities will be located. All water features will be surveyed. Several channel cross-sections shall be measured. A surface topography map with 0.5 foot contours will be compiled and used as the basis of the design plans.

#### 1.2 Hydrology and Hydraulics

Extensive data has been collected on the hydrology of the area. However, recent events, such as berm breaches and berm repairs, have influenced site hydrology. To ensure a complete understanding of site hydrology, the EarthMark Team placed hydrologic monitoring devices on the site. To accurately assess the existing and proposed hydrology of Parcels 1 and 2, tide gauges were placed in Losen Slote Creek, Muddabock Creek and the Hackensack River. The gauges were surveyed and will be monitored for subsequent data reduction analysis. The spring high tide, mean

high tide and mean low tide elevations will be determined based on the tide gauge data. This information, together with previously collected site data as well as published U.S. Geological Survey (USGS) and NOAA information, will be used to establish the mean tidal cycle for the site.

For Parcel 3, five groundwater monitoring wells were installed and surveyed and are being monitored for several months during the growing season. The hydrologic and hydraulic analysis will consist of performing a water budget simulation of the proposed freshwater wetland design and conducting groundwater level monitoring program. The target restoration hydrology for the Bank is currently envisioned to be a freshwater forested system. The EarthMark Team will develop discharges for the 1-year, 2-year and 100-year storm events for the creeks adjacent to Parcel 3 of the Bank. An additional 100-year discharge will be calculated based on fully developed conditions within the watershed. This ultimate development 100-year discharge will serve as the Regulatory Flood, which will be used in the Flood Hazard Area Permit hydraulic analyses. The hydrologic analysis will also assess the affect of the project on the upgradient adjacent marshes.

### **1.3 Soils and Geotechnical Characteristics**

Soils on the entire Site are mapped as Transquaking mucky peat, 0 to 1 percent slopes, very frequently flooded (TrkAv). According to the Natural Resources Conservation Service (NRCS), this soil is found on tidal marshes on coastal plains. The parent material consists of herbaceous organic material over loamy material. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very high. Shrink-swell potential is low. This soil is very frequently flooded and is frequently ponded. Organic matter content in the surface horizon is typically about 70 percent. This soil meets hydric criteria. The soil has a strongly saline horizon within 30 inches of the soil surface.

Berger is currently assessing the nature of soils on the Site. Based on our subsurface investigations, it appears that the clayey silt or silty layer at about 2 to 3.5 feet below ground surface may be used as suitable impervious soil barrier material for the berms to be constructed on the site. The EarthMark Team is conducting laboratory testing to further evaluate the soils types within the Site, assess constructability, and design the berm. Based on review of soil boring logs and physical testing data gathered from the subsurface investigations, subsurface soil mapping will be prepared to aid in excavation planning and wetland design. Information obtained will be used to identify the physical characteristics of the material to be excavated and to identify any special construction concerns.

## **2.0 CHEMICAL CHARACTERISTICS**

### **2.1 Water Quality**

Surface waters on and in the immediate vicinity of the Bank have a NJDEP classification of either FW-2 NT (freshwater non-trout) or SE-2 (estuarine). Freshwater bodies that are classified as FW-2 NT normally have salinity values less than or equal to 3.5 parts per thousand (ppt). The NJMC and the USGS have monitored water quality conditions in the Hackensack Meadowlands District from 1993 to present for parameters such as dissolved oxygen (DO), turbidity, heavy metals and fecal coliform bacteria. Two of the 14 monitoring stations are located near the Bank. The results of various studies indicate that the river within the vicinity of the Bank has seasonally low DO levels and is impacted by pollutants such as heavy metals and fecal coliform bacteria. As a result, habitat for fish as wildlife has become degraded relative to the conditions which existed prior to development of the region. The salinity data from 1993 to 2000 suggests that the Hackensack River in the vicinity of the Bank fluctuates from fresh to brackish based on influencing factors such as freshwater inflows resulting from precipitation, wind conditions, distance from the mouth of the estuary, and river basin morphology. From 1995 to 1997, salinity values near the Bank ranged from 0.2 to 8.4 ppt and from 1997 to 2000 they ranged from 0.5 to 10.4 ppt. On-site salinity measurements recently collected by Berger scientists were within these ranges.

### **2.2 Sediment Quality**

The EarthMark Team understands that sediment and soils on the Site have been sampled in the past and more recently as part of the Meadowlands Comprehensive Restoration Implementation Plan. Berger will review this information, conduct supplemental sampling and provide a summary to the IRT in the MBI.

### 3.0 BIOLOGICAL CHARACTERISTICS

#### 3.1 Baseline Plant and Wildlife Surveys

The EarthMark Team understands that plant and wildlife resources on the Kane Tract have been assessed in the past. This existing data will be used to document the nature of existing biological resources at the site. Supplemental biological studies of the Site will be conducted to establish baseline conditions for regulatory approval.

#### 3.2 Bio-Benchmark Surveys

The use of bio-benchmarks is critical in wetland mitigation design for setting grades and elevations. Bio-benchmark studies involve establishing precise vertical elevations within a nearby existing reference wetland and coupling these elevations with observations of key vegetative, soil and hydrological characteristics. For Parcels 1 and 2, the EarthMark Team will rely on the extensive biobenchmark data set available for tidal wetlands within the Meadowlands. Based on this data, the following will be ascertained (1) the lower elevation for stunted *Spartina alterniflora*; (2) the elevations for strong and vigorous *Spartina alterniflora*; (3) the lower elevation of *Phragmites australis* colonization; and (4) the elevations for strong and vigorous *Spartina patens*. For Parcel 3, bio-benchmark data will be gathered from representative freshwater forested wetlands in the Meadowlands, such as Teterboro Woods. The licensed land surveyor will survey the bio-benchmarks for elevations.

#### 3.3 Wetlands and Waters of the U.S.

The Hackensack River is the nearest major surface water body, flowing along the eastern boundary of the Site. In the vicinity of the Site, the river is classified as SE-2 – a saline estuary with designated uses such as secondary contact recreation, maintenance and migration of fish populations, migration of diadromous fish, and maintenance of wildlife (SWQS) (N.J.A.C. 7:9B). The Site is located within the Hackensack Drainage Basin, which drains 201.6 square miles of land (NJDEP, 1972). According to available federal and state mapping data, the Site is covered entirely by wetlands. The *New Jersey I-map* database indicates that the area is coastal wetland dominated by *Phragmites*. The *US Fish and Wildlife Service Digital Mapper* indicates wetland types to be estuarine and marine. NJDEP maps the Site as covered primarily by saline marshes with one small segment, approximately 500 feet across, along the southeastern Site boundary, covered by herbaceous wetland. While wetlands on the property have been delineated previously, Berger has delineated the wetland boundary on the site to reflect current conditions and will submit a Jurisdictional Determination request to the Corps. The delineation determined the presence of wetlands within the project limits pursuant to the *Corps of Engineers' Wetland Delineation Manual* (Environmental Laboratory 1987). Wetland boundaries were flagged in the field for survey. The EarthMark Team will meet with Corps personnel at the site to review the wetland line and delineation methods.

#### 3.4 Threatened and Endangered Species

The NJDEP Natural Heritage Database, U.S. Fish & Wildlife Service and the National Marine Fisheries Service have been re-contacted for information regarding potential threatened and endangered species and essential fish habitat occurring within the project area.

#### 3.5 Indicator Value Assessment – Baseline Conditions

Berger is using the Indicator Value Assessment (IVA) to determine the current functions and services of wetlands within the Site. Berger will meet with IRT agency personnel at the Site to review the functional assessment.

### 4.0 CULTURAL RESOURCES SURVEY

Cultural resources on the Kane Tract have been assessed in the past, particularly as part of the Meadowlands Mills Malls FEIS (2002). This information has been reviewed and the State Historic Preservation Office (SHPO) has been contacted to allow for this existing data to be used to document the nature of any cultural resources.

### 5.0 CONCLUSIONS

All information collected to date indicates that the site is ecologically suited to be established as a wetland mitigation bank.

## EXHIBIT C: CONCEPTUAL DESIGN PLAN

### Overview

The EarthMark Team has developed a preliminary concept plan for the Bank which is described below. The design plan will be further developed once detailed site topography, soils, hydrology, vegetation and other studies are completed.

### Invasive Species and ATV Management

Based on conditions within the Bank boundary, it is expected that common reed (*Phragmites australis*) will be the primary invasive species of concern. Other species of concern include, but are not limited to, mile-a-minute weed (*Persicaria perfoliata*), Japanese knotweed (*Polygonum cuspidatum*), and purple loosestrife (*Lythrum salicaria*). The EarthMark Team proposes to treat invasive species within the Bank site prior to construction, to employ design considerations that minimize re-establishment of invasive species after construction, to subsequently monitor vegetation within the Bank and to routinely control non-native species.

Currently, portions of the site are heavily used by unauthorized all-terrain vehicles (ATVs). In some areas, soils are compacted and vegetation is absent due to the presence of ATV trails. The design will include impediments to ATV use to the maximum extent possible. Subsequent to site construction and planting, the site will be posted and frequently inspected to ensure ATV traffic is not present.

### Conceptual Design Approach – Tidal Portion of the Kane Bank (Parcels 1 and 2)

Parcels 1 and 2 together provide a significant tidal wetland restoration opportunity in the Meadowlands District. Currently, tidal water is segregated from the Site via berms along the Hackensack River and Losen Slote Creek. Tide gates on Mudabock Creek (also known as Muddabach Creek) and Moonachie Creek further restrict tidal waters from entering the site.

The first goal for restoration of these parcels is to **restore and maintain targeted tidal hydrology**. The EarthMark Team proposes to remove portions of the berm along the eastern boundary of Parcel 2 to restore overland tidal flow to Parcel 2 and to create new tidal creeks and support low marsh habitat (refer to Figure 1 for the conceptual design) including a new free flowing creek from the Hackensack River that would connect to Moonachie Creek. Restoring tidal hydrology to Parcel 1 is more complex due to the location of the Williams/Transco pipeline. The tidal water from Parcel 2 will be conveyed past the Williams/Transco pipeline to Parcel 1 at Mudabock Creek and at up to three new locations (as depicted on Figure 1). Additional tidal creeks would be constructed to convey tidal flows within the parcel to support low marsh habitat. The EarthMark Team has held multiple meetings with Williams/Transco to discuss the proposed crossings to garner Williams/Transco's support. Williams plans to install sags in the pipeline, so that the streams may be constructed over the pipe, with a bridge over the streams to continue to allow vehicle access on their easement.

The hydrologic design of the project will protect surrounding areas from tidal flooding. Berms will be constructed to the north and west of the Bank (Figure 1) to preclude tidal waters from entering the surrounding wetlands and uplands. It should be noted that a separate project is building new redundant tide gates for Moonachie Creek and Bashes Creek on the south side of the NJ Turnpike. The redundant tide gates will prevent tidal flows from entering Moonachie Creek.

To improve tidal circulation to the Site, an alternative concept design has been developed that allows some tidal water to flow through the Moonachie Creek redundant tide gate to the Kane Bank (Figure 2). EarthMark would then construct an additional tide gate or other structure at the northwest corner of the site to prevent tidal waters from discharging to upstream, developed areas. This alternative design will require extensive coordination with NJMC, the MCT, NJTA, Williams/Transco and the regulatory agencies. All resulting agreements on tide gate design, installation and maintenance will be documented in the Mitigation Banking Instrument. This alternate design would still include a tidal berm along Moonachie Creek. However, downstream of the proposed EarthMark tide gate, the berm would be on the west of the creek. This design will prevent tidal flows from encroaching on the freshwater wetland to the west of Moonachie Creek.

The second goal for restoration of these parcels is to provide the correct *site topography/elevations* to support the desired tidal marsh vegetation and features. Based on site topographic, hydrologic and biobenchmark data to be collected, the elevation of the Site will be designed to support a tidal salt marsh. Once appropriate tidal hydrology and topography are established on the site, the next goal is to *develop native vegetation and habitat* on the Site. Based on experience in the Meadowlands, the EarthMark Team would propose to plant Parcels 1 and 2 with the native saltmarsh species. In addition to the proposed plantings, additional native species are anticipated to colonize the Site. The growth of these native species will be encouraged and the growth of invasive species, such as *Phragmites*, will be discouraged by selectively spraying herbicide.

The final goal for the restoration is to *maximize the wetland functions and services*, particularly for wildlife habitat and water quality improvement. The Kane Tract's location within the Hackensack Meadowlands designates it as a part of the Atlantic Flyway, providing a crucial stopover site for birds during their southbound migration in late summer and fall. It also serves as an "oasis" for wildlife in a predominantly urban landscape, offering natural habitat in an area limited with such resources. The dominance of *Phragmites* throughout the existing Kane Tract has created a monoculture of habitat, limiting habitat diversity and, therefore, decreasing wildlife species diversity. *Phragmites* has replaced native marsh plants species and its dense cover has adversely affected hydrology and, therefore, the use of open water and marsh surface by aquatic species.<sup>1</sup> The restriction on tidal influences also attributes to this pattern, preventing shorebirds, waterfowl, waders and other species from utilizing the marsh surface for foraging (Seigel et al. 2005).<sup>2</sup>

By restoring the marsh to contain a variety of habitats, wildlife species diversity has the opportunity to increase. Avian species, in particular, are found to be attracted to a variety of habitats in comparison to a single habitat type.<sup>3</sup> The combination of mud flat, open water, low marsh, high marsh and scrub-shrub proposed for the Bank would provide the diversity of habitat types needed to support a variety of wildlife species, whether on a migratory stopover or as a resident. Restoring the tidal flow would allow fish, shellfish and aquatic invertebrate species to utilize the tidal channels and provide valuable foraging opportunities for bird species along mudflats during low tide. Available mudflat habitat is an important energy source for migrating shorebirds. The open water habitat provided by tidal channels would allow for open water foragers to utilize the Bank, and provide summer and winter roosting grounds for waterfowl species. Waterfowl, waders and divers would utilize the tidal creeks for feeding and resting. To support use by diverse avian species and to protect the salt marsh plants, seagull and Canada goose populations will be discouraged by the use of herbivory fencing and other measures.

To ensure that the restoration goals are achieved, the EarthMark Team will use a *Design/Build* approach to ensure seamless integration between the design, construction and planting phases of the project. Proper construction is the key to restoration success. Based on experience in the Meadowlands, the EarthMark Team plans to conduct most of the earthwork in the dry by using existing and proposed berms. Low pressure ground vehicles and timber mats will be employed as needed to minimize compression of wetland soils. Once design grades are achieved, the tidal connections will be restored and the wetland will be planted.

### **Conceptual Design Approach – Freshwater Forested Wetland Portion of the Kane Bank (Parcel 3)**

Proposed design goals for Parcel 3 are to provide a seasonally saturated forested wetland bordered by a riparian forested upland along Losen Slote Creek and to preserve and enhance the existing early successional forest stands. Parcel 3 currently contains a patch of early successional forest dominated by a mixture of grey birch, aspen and cottonwood. Invasive species such as mile-a-minute and multiflora rose are present. The understory includes a mix of shrubs, including some native shrubs such as arrowwood. Upland soils ranging from a dark brown silt loam in the A-horizon to brown silty clay in the B-horizon are similar to those observed within

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<sup>1</sup> Tiner, R.W. and H.C. Bergquist. 2007. The Hackensack River Watershed, New Jersey/NewYork Wetland Characterization, Preliminary Assessment of Wetland Functions, and Remotely-sensed Assessment of Natural Habitat Integrity. U.S. Fish and Wildlife Service, National Wetlands Inventory, Ecological Services, Region 5, Hadley, MA.

<sup>2</sup> Seigel, A., C. Hatfield, and J.M. Hartman. 2005. Avian Response to Restoration of Urban Tidal Marshes in the Hackensack Meadowlands, New Jersey. Urban Habitats 3: 87-116.

<sup>3</sup> Mizrahi, D.S., N. Tsipoura, K. Witkowski, and M. Bisignano. 2007. *Avian Abundance and Distribution in the New Jersey Meadowlands District: The Importance of Habitat, Landscape, and Disturbance*. New Jersey Audubon Society.

upland forests near the Teterboro woods. These soils most likely developed under a forest canopy and may have been farmed in the past. A small dense patch of staghorn sumac is present near Losen Slote Creek on a topographic rise. Remnants of a berm or dredge spoil appear to be present along the creek near the existing tide gate. Aside from this area the remainder of the site is characterized by large patches of dense common reed broken up by ATV tracks. A variety of forbs and grasses tolerant of disturbance have established along the borders of these disturbed areas.

### **Design Features and Approach**

The concept design seeks to maintain existing, higher value habitats such as the early successional forest. Removal and control of invasive species and limited planting to enhance diversity within the understory will be performed. The northeastern edge of the site borders Losen Slote Creek, which would provide an ideal location to re-establish a riparian forested wetland. Surface water within the creek is partially controlled by a tide gate and fluctuates based on precipitation and runoff from within its drainage area. Elevations along portions of the creek appear to be higher than would be normally expected, which may indicate past dredging and filling activities. Minor grading may be required to establish appropriate elevations for wetland establishment. This would also allow for the removal of common reed rhizomes.

The majority of the site currently dominated by common reed will be restored to a forested wetland. Based on initial site investigations by the EarthMark Team, only minor grading may be necessary in this area. The removal of existing common reed is essential to the successful restoration of this area. Mowing and/or herbicide spraying will be conducted in the Spring of 2009 to assist with *Phragmites* eradication. This will be followed with herbicide treatment in the Fall of 2009. Finally, before rough grading the site will be disked to break up the root mat and expose rhizomes. Grading will be performed as necessary to achieve desired elevations. Areas of soil compaction along ATV trails will be removed as well. After the initial rough grading is complete, microtopography will be re-introduced. A bedding harrow will be used to create a random series of mounds and depressions with an 8- to 12-inch range in height. An emergent wetland/vernal pool may be designed as a freshwater emergent marsh surrounded by wetland shrubs.

### **Hydrology and Hydraulics**

The intended hydrologic regime for forested wetlands is a seasonally saturated condition capable of supporting a forested wetland system. To meet requirements for a seasonally saturated wetland, a seasonally high water table must be within the root zone (i.e., approximately 12 inches from the ground surface) for a minimum of seven consecutive days during the growing season. The design will provide for a minimum of 14 days of continuous soil saturation within the root zone (upper 12 inches) during the growing season for a normal precipitation year. Groundwater monitoring gauges have been installed within the site to monitor groundwater elevations through the early spring to support the development of a water budget. The water budget will be used to verify appropriate grades that will provide the appropriate wetland hydrology criteria during a normal to wet year. Hydrologic input to the wetland mitigation site will consist of groundwater, direct precipitation and surface runoff from the adjacent watershed. Water from Losen Slote Creek will not be directed to the wetland. The mitigation design of the forested wetland will depend primarily upon groundwater and surface runoff input and secondarily on direct precipitation. The emergent wetland/vernal pool component will have a seasonally flooded hydroperiod. This will be achieved by excavating the area to a deeper depth (between one and two feet) than the seasonally saturated forest areas.

### **Planting and Seeding Plan**

The planting and seeding plan for the riparian area and forested wetland will be similar. The plant material will be installed in a naturalized pattern to provide a relatively even distribution of each species across the planting areas at the specified densities. The plant material will consist of a mix of hardwood trees and shrubs. The entire area will be seeded with a mix of native grasses, rushes, sedges and forbs to reduce erosion and encouragement rapid cover of exposed soils. Recruitment of native wetland plants is anticipated and will be influenced by the prolonged inundation and water depth associated with the pools.



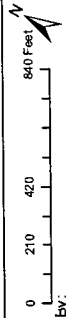
**RICHARD P. KANE  
NATURAL AREA  
WETLAND MITIGATION BANK**

Figure 1

**Conceptual Plan**

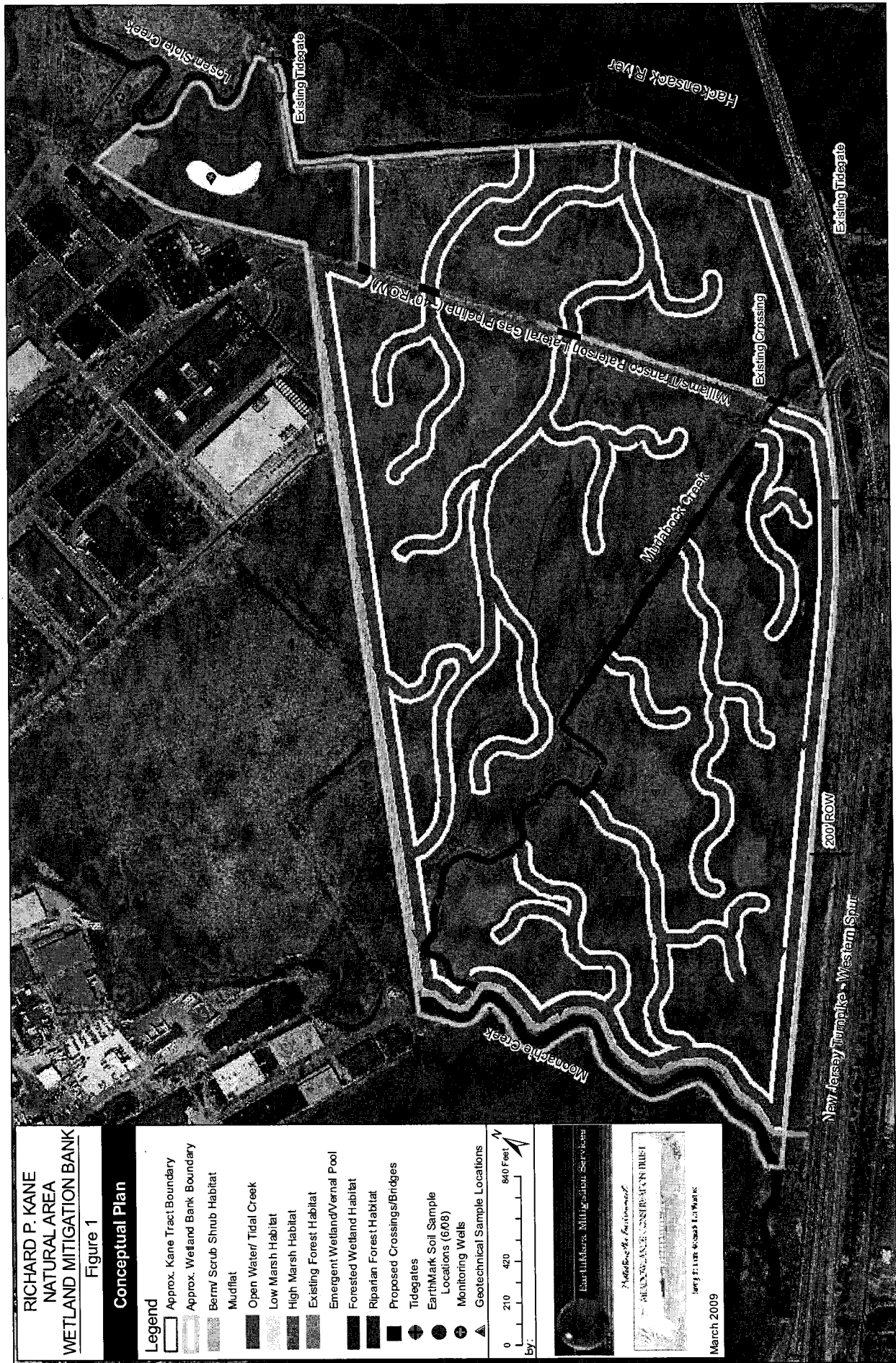
**Legend**

- Approx. Kane Tract Boundary
- Approx. Wetland Bank Boundary
- Berm/ Scrub Shrub Habitat
- Mudflat
- Open Water/ Tidal Creek
- Low Marsh Habitat
- High Marsh Habitat
- Existing Forest Habitat
- Emergent Wetland/Vernal Pool
- Forested Wetland Habitat
- Riparian Forest Habitat
- Proposed Crossings/Bridges
- Tidegates
- EarthMark Soil Sample Locations (6/08)
- Monitoring Wells
- Geotechnical Sample Locations



EarthMark Mitigation Services

March 2009



# **RICHARD P. KANE NATURAL AREA WETLAND MITIGATION BANK**

Figure 2

## **Alternate Conceptual Plan**

### **Legend**

- Approx. Kane Tract Boundary
- Approx. Wetland Bank Boundary
- Berm/ Scrub Shrub Habitat
- Mudflat
- Open Water/ Tidal Creek
- Low Marsh Habitat
- High Marsh Habitat
- Existing Forest Habitat
- Emergent Wetland/Vernal Pool
- Forested Wetland Habitat
- Riparian Forest Habitat
- Proposed Crossings/Bridges
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